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**PERIMETER MARKING SYSTEM OF PLAY AREAS WITH VARIABLE LAYOUT**Background of the invention

The present invention relates to a perimeter marking system with variable layout for areas to play soccer or practice other games characterized by the presence of a ball or other equipment to be thrown.

The present invention also relates to a structure for specific training, instruction or simply for playing soccer or other games characterized by the presence of a ball or other objects to be thrown.

Prior art

10 The current state of the art for ball games, such as soccer, five-a-side, handball, basketball, or with other equipment to be thrown backward and forward among several players, such as the ice hockey pick, proposes playing fields with perimeters that are either fixed lines traced on the ground or rigid barriers fixed to the ground, in italian normally called "gabbie" (fencing).

15 The completely static nature of these structures or of these perimeter markings considerably limit attainment of the objective "optimal intensity": often the dimensions of a field suitable for a certain group of athletes are not so for another group with different numeric, technical, athletic or tactical characteristics. For example, a soccer field with regular dimensions may be too tiring and frustrating  
20 for a group of occasional players with numbers well below 22 players and of average-below average level, without training and with little perception of the overall game, or not suitable for training a small group of very young amateur soccer players, such as 12-14 year olds.

Moreover, the fact that prior art perimeter marking barriers are fixed to the ground  
25 makes it necessary to install them on synthetic surfaces or, in the case of natural coverings, to use them parsimoniously, otherwise the bottom can be ruined after a short time.

Moreover, the fact that the layout of the soccer goals is fixed for each model, almost always with the two regular soccer goals, makes it necessary to have two  
30 goalkeepers and in any case makes their correct use by youngsters below about 12 years old impossible, thus precluding creation of variable combinations that represent an interesting instructional instrument, as they are mentally stimulating

and at the same time relaxing, being removed from the normal layout and with greater opportunities for implementation.

### Summary of the Invention

The present invention intends to obviate the limits of prior art, in a first aspect, with a perimeter marking barrier of a playing field characterized in that it comprises one or more barrier elements disposed along the perimeter of a playing field; at least one of these barrier elements comprises a reflecting surface extending vertically and suitable for retaining inside the playing field an object to be thrown which hits against said reflecting surface, the barrier element being designed to be moved and/or deformed in such a way as to modify the perimeter of the playing field.

In a second aspect, the present invention intends to obviate the limits of prior art with a perimeter marking barrier element suitable for forming a perimeter marking barrier of a playing field according to the first aspect of the present invention, said barrier element being characterized in that it comprises at least a reflecting surface extending vertically, suitable for retaining inside the playing field an object to be thrown which hits said reflecting surface and is suitable for being moved and/or deformed in such a way as to modify the perimeter of the playing field.

Finally, the present invention intends to obviate the limits of prior art, in a third aspect, with a reflecting perimeter marking system with variable layout for play areas, utilizing reflecting barriers, suitable for specific lactacid training, instruction and games activities, related to the game of soccer and other sports in which a ball is played inside a field; this perimeter marking system is characterized in that it has, as fundamental constituent elements, the modules, or segments of barrier, separate or connected non-rigidly, thus making it possible, for each example, to delimit play areas of variable dimensions.

The present invention has been conceived to adopt the intensity of play as fundamental parameter, adjusting it according to different needs: optimizing lactacid work during play, decreasing idle times and adapting competition spaces, moreover eliminating perimeter lines, all frustrating components, which can strongly impair attainment of instructional and game objectives.

In the second aspect of the present invention the fundamental constituent element of the perimeter barrier is the "module", that is a totally independent segment of

barrier.

Each client may choose a specific number of modules to allow perimeter marking combinations deemed most suitable for their purposes.

As well as the number of modules, the choice will also include the dimensions and the goals (in terms of number, measurements and position inside the reflecting surface) of each.

Preference, by the client when placing the order, for a certain range of possible combinations is determined by the numeric, technical, athletic and/or tactical characteristics of the foreseeable range of users, and by the range of stimuli one wishes to provide.

It is also apparent that, with a specific number of purchased modules, the perimeter of a single large or several smaller fields may be marked, and that for all these fields perimeter marking may vary from total to partial, to the extreme limit of a single module employed along the delimiting lines.

Again with regard to particular uses, each single module may also be inserted inside training exercises, such as shooting at goal or kicking or in general technical or technical-athletic exercises that may and must be created each time.

These and other advantages attainable with the present finding shall become more apparent to those skilled in the art from the following detailed description of some particular non-limiting embodiments, with reference to the accompanying figures.

#### List of figures

Figure 1 schematically shows a first particular embodiment of a perimeter marking barrier element of a playing field, according to the second and third aspect of the present invention;

Figures 2 and 3 respectively show schematically a second and third particular embodiment of a perimeter marking element of a playing field, according to the second and third aspect of the present invention;

Figures 4 and 5 are relative to a first embodiment of a perimeter marking barrier of a playing field, according to the first aspect of the present invention;

Figure 6 schematically shows a second embodiment of a perimeter marking barrier of a playing field, according to the first aspect of the present invention.

Figure 7 schematically shows a fourth particular embodiment of a perimeter marking barrier element of a playing field, according to the second and third aspect of the present invention.

#### Detailed description

5 With reference to Figure 1, we shall now describe a first particular embodiment of a perimeter marking barrier element according to the second and third aspect of the present invention, which embodies the general sporting philosophy of the system, and a series of static principles and functional characteristics with relative technical solutions thereof of possible reference; this barrier element in the present  
10 description will also be referred to as "module".

The barrier element in the example in Figure 1, indicated as a whole with 100, is characterized by the presence of three goals: two in the centre, one inside the other (the soccer and five-a-side goals) and another smaller goal to the side.

The barrier element in Figure 1 may have widely variable dimensions, indicatively  
15 and not necessarily from 30 cm to 6 m in height and from 2 m to 20 m in width. The goals contained in it may also be variable in terms of dimensions, position and number inside the reflecting surface.

Stability is guaranteed by a metal structure composed of two side arches 2, positioned on two vertical and parallel planes and connected by two stringers  
20 which, in relation to the used side of the barrier element, may be identified respectively as front-upper 1' and rear-lower 1'' also having a counterbalancing function above all in relation to the action of the wind.

Orthogonal to a third stringer, front-lower 1''', located on the vertical plane passing through 1' (plane of the reflecting barrier) and just above ground level, carriages  
25 3', 3'' are coupled to connect it to 1'', if necessary together with crosspieces.

Vertically, the stability is guaranteed by two side uprights 4 positioned behind the front surface or, alternatively, by a series of diagonals, positioned in the planes on which the two arches lie, and fixed to them, and to the junction between the side  
carriages 3' and the stringer 1'''.

30 In a direction parallel to the barrier element, that is orthogonal to the plane of the arches, two braces 5 and a medial stringer 6, fixed to the arches, all contribute towards stability.

Positioned with the opening on the front vertical plane are the soccer goal 700, the five-a-side goal 701 and a third goal 701 (even smaller than the regular five-a-side goal 701), comprising an "external structure" 7 very similar to the structure of models of traditional soccer goals.

5 The posts of the soccer goal 700 rest, interrupting it, on the stringer 1"', in the sense that it does not extend along the opening of each goal.

At these discontinuous points, the regular soccer goals 700 have carriages 3'', which provide stability both vertically by resting on the ground, and orthogonal to the opening through being connected to the stringer 1'', whereas in the other  
10 smaller goals 701, 702, these carriages 3''' are not coupled to the stringer 1'', but extend at the rear of the opening for a depth sufficient to give the sense of a goal.

This "external goal structure" has, at the rear, at the level of the posts and on planes orthogonal to the goal opening and vertical, frames 8', 8'' closed and fixed to the posts along the common side. The internal side nets of the goals are fixed to  
15 these frames (omitted in the figure for simplicity). Moreover, their upper sides are shaped like tracks, on which sliding supports 9 are positioned. These are connected to what can be defined internal structures 10', 10'', 10''', each of which is a closed frame, perimetrical to the goal opening, thereby adjacent on three of its sides to the goal to which it is connected, by the aforesaid supports, and also by  
20 locking elements 11 positioned about halfway up the uprights.

Fixed tautly on the front part of the barrier element 100 is an elastic fabric surface, EL, which can be chosen for example from the many available, some of which are already used for analogous purposes.

This fabric transforms into a reflecting plane the entire front plane of the structure,  
25 that is the portion of the vertical plane between the two front stringers 1' and 1'''.

The elastic fabric EL retains and if necessary returns a soccer ball, five-a-side ball or other object to be thrown which impacted against it.

The part of fabric EL outside the opening of the goals is fastened to the two stringers 1' and 1''' and to the goals 700, 702, whereas inside the openings of  
30 these goals, as seen, it is supported by the closed frame 10' or 10'''. The total reflecting surface disposed on the front side of the barrier element 100 is thereby composed of four reflecting surfaces, that is of the three reflecting surfaces EL',

EL'', EL''', fixed to the frames 10', 10'' and 10''' and of the reflecting surface EL<sub>4</sub> fixed to the two stringers 1', 1''', which defines compartments, at the level of the openings of the goals 700, 701, 702.

When the goal in question (for example 701) is to be used, the locking elements 11 are released to allow the internal frame 10'' to slide backwards along the tracks. With the frame 10'' locked on the goal 701 this is instead closed and transformed into reflecting barrier. The other goals 700, 702 can be opened or closed analogously.

The rear side frames 8', 8'', may be self-supporting 8'' through carriages 3''' and a reciprocal connection through an upper crosspiece 12. However, in the case of a regular soccer goal they will be connected to the rear stabilizing structure, in particular to the stringer 1'' through the carriages 3'' and if necessary to the medial stringer 6 through continuation of the upper track.

Of all the carriages 3'' present at least two are provided with a locking system. Moreover, a tie-rod system may be provided to produce lateral tension in the elastic barriers.

Advantageously, the barrier element 100 is provided with a small goal 702, in a non central position, which can be used for example with a particularly small number of players, or to compensate for the absence of a valid goalkeeper.

The barrier element 100 may be used to compose, together with other barrier elements, for example although not necessarily movable, a perimeter marking barrier that encloses and delimits a playing field for a sport using a ball (for example soccer or five-a-side) or another object to be thrown (for example an ice hockey puck); by moving one or more movable barrier elements it is possible to modify the perimeter of the playing field (Figures 4, 5, 6) to adapt the form and surface of the field to the needs of the players, for example reducing the surface of the field or using a single five-a-side goal 701, 702, smaller than a traditional soccer goal 700, if the players are of average-below average level (with little or no training, and with poor perception of team tactics) and only present in a small number: on a smaller playing field than a regular soccer field for twenty-two players, and by introducing for example the rule that play is continued when the ball bounces or in any case touches the perimeter marking barriers falling back

into the playing field, this prevents the players from becoming too tired and frustrated, facilitating continuity of the game and increasing enjoyment.

In the case of players of a higher level, the movable barriers may be moved so as to enlarge the playing field.

5 By making the perimeter marking barriers easy to move (for example by producing suitably light barriers, provided with wheels and/or ballasts to be added or removed) it is possible not only to vary the form and surface of a playing field just before a game, but also for example during a training session, so as to make this more effective.

10 Figure 2 shows a second example of a perimeter marking barrier element according to the first aspect of the present invention and indicated as a whole with 200, useful to compose movable perimeter marking barriers according to the present invention: this barrier element 200 has a reflecting surface EL2 divided into three bands F1, F2, F3 disposed horizontally above one another;  
15 advantageously, the lower band F1 is more rigid and cushions impacts to a lesser degree than the band F2, which in turn is more rigid and cushions impacts to a lesser degree than the band F3; for example, the band F1 may be made as rigid as and cushion impacts to the same degree as a wooden board a few centimetres thick, the band F2 may be made as rigid as and cushion impacts to the same  
20 degree as a relatively soft foam rubber mat and the band F3 may practically prevent the ball from bouncing, almost totally cushioning the kinetic energy of a propelled ball and having the sole function of keeping the ball inside the perimeter of the game. For example, in the embodiment in Figure 6, the top band F3 of the movable barrier that separates two soccer or five-a-side fields of variable surface  
25 is produced as a polyethylene net: in this way the lower band F1 facilitates continuity of play, the softer band F2 and the band F3 prevent the players from being hurt in accidents (for examples impacts against the barriers or balls bouncing back in their faces) while keeping the ball inside the enclosed play area. Preferably although not necessarily, the height of the most rigid band F1 does not  
30 exceed 0.3 m, and even more preferably a height of about 0.2 m so that it reflects only low balls with little cushioning, while the height of the band F2 and the rigidity of the bands F2 and F3 will be chosen so that, for example, when players of

medium stature collide with the barrier they do not fall over, breaking their femur or tibia, or causing other injury to the legs.

Alternatively, the higher bands F2 and F3 may also only partly cushion the energy of the kick (for example to 50%) to allow a certain degree of bounce and continuity of play.

In the particular embodiment in Figure 2, moreover, the reflecting surface EL2 advantageously has a convex form and an inclination variable according to variation in height, with a first portion of reflecting surface (for example the band F1) directed downwards in the lowest part of the barrier element 200, a second portion of reflecting surface (for example the band F3) directed upwards in the highest part of the barrier element and a flat intermediate portion directed vertically, so as to respectively deflect low kicks downwards, high kicks upwards and keep kicks at intermediate height at the same height: in this way the probability of kicks bouncing off the perimeter marking barriers hitting players in the face is reduced.

Figure 3 shows a third embodiment of a movable barrier element according to the second aspect of the present invention: this movable barrier element 300 has two reflecting surfaces EL3, EL3' located on two opposite sides of the element so that the element can be used to compose the movable side 401 of the perimeter marking barrier 400 shown in Figure 4: this perimeter marking barrier 400 comprises four perimetrical sides 402 produced with fixed reflecting barriers, and the separating movable barrier 401 that can be moved in the direction of the length of the external enclosure so as to divide the entire rectangular field into two smaller rectangular fields (which when one is enlarged the other is reduced): this perimeter marking system may be advantageously used in sports or leisure centres to obtain a large number of playing fields to hire out on a certain total area, especially in existing sporting facilities.

Returning to Figure 3, the barrier element 300 is produced as a hollow body made of plastic material, which may be filled with ballasting material (for example water or sand) and emptied easily, in order to move the barrier element rapidly by hand and modify the perimeter of the playing field just before a game or also during a training session.



Advantageously, the movable barrier element 300, just as the barrier element 200 (Figure 2), are provided with wheels 201 on which they run in order to be moved.

Figure 6 shows a second embodiment of an intermediate movable barrier 600 that can be moved slidingly inside a enclosed fixed rectangular play area of known type, so as to define two playing fields of variable dimensions; both the fixed  
5 perimeter marking barriers and the intermediate movable barrier 600 have a lower part F2 with increased rigidity and less cushioning of impacts and an upper part F3 with greater cushioning of impacts, such as to cushion 50% of the kinetic energy of a propelled ball; in the specific example in Figure 6 the upper band F3 of the  
10 intermediate movable barrier 600 has been produced as a structure with posts, between which a polyethylene net 601 extends.

The intermediate movable barrier 600 has also been produced by the inventor by aligning five barrier elements each approximately 4 metres in length: this barrier moves on wheels and has a total weight that allows two men to move it by hand  
15 when assembled, without separating the modules.

Figure 7 schematically shows a fourth embodiment of a reflecting barrier element according to the second aspect of the present invention: this barrier element, indicated as a whole with 704, comprises a first reflecting surface EL7 of greater dimensions, and a second smaller reflecting surface 710 (for example, although  
20 not necessarily, rectangular or square in shape) produced with one or more panels 711 capable of cushioning kicked balls (or other impacts of propelled objects impacted against the panels) in a substantially different way to the way in which the rest of the reflecting surface cushions; for example the reflecting surface 710 may be produced with one or more mats 711 placed against a reflecting surface  
25 EL7 that reflects kicked balls to a much greater extent than the mats; the mats are preferably fixed to the reflecting surface EL7 so that they are easy to remove from and reposition on it.

The area 710 covered by the panels 711 is of a form that makes it usable as a goal, with regular or other dimensions, to play or train for soccer, five-a-side,  
30 hockey or other sports with objects to be thrown.

This embodiment makes it possible to vary with considerable ease the form, dimension, position and number of the goals used on a specific perimeter marking

barrier element.

Advantageously, the area 710 is surrounded by a border 712 with the function of highlighting whether a ball kicked at the limits of the goal is a valid goal; for this purpose, the border 710 can be produced in a lighter material than the mats 711, or fixed in a sufficiently labile way so as to vibrate or in any case move in an obvious way when it is hit.

The embodiments described hereinbefore are susceptible to numerous modifications and variations without however departing from the scope of the present invention: for example the perimeter of the playing field may be modified to deform the perimeter barriers (which may for example be constituted by a single movable and deformable barrier) rather than moving one or more barrier elements. Among the alternative solutions the one relative to installation in enclosed fields is worthy of mention.

The enclosures may be made to functionally and materially replace the rear supporting structure of the modules. These may, for example, be fixed through cables that can be wound around the net behind and reciprocally between the front elements.

It must also be borne in mind that the barriers may also be produced in other materials (particularly plastics) especially in the goal areas, thus making it unnecessary to produce the internal frames, although taking account of greater thrust of the wind.

The zone stretching from the ground to approximately 1 m in height may be made more rigid.

All these and other alternative solutions shall be assessed case by case.

All modifications and variants coming within the meaning and field of equivalence of the claims are understood as included in them.

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